

# NATURAL HISTORY MISCELLANEA

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## The Identity of the Salamander *Gyrinophilus danielsi*, with Description of a New Subspecies\*

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While collecting in the Great Smoky Mountains National Park in eastern Tennessee in the summer of 1948 the writer secured a topotypic specimen of *Gyrinophilus danielsi danielsi* at Indian Gap, Sevier County, Tennessee. This specimen did not agree with the illustration, presumably of that form, based on an adult female taken on Mt. Mitchell, Yancey County, North Carolina, given in Bishop's *Handbook of Salamanders*. A total of eight specimens conforming with the illustration cited were later found in the collections of Dr. Bishop, the Chicago Natural History Museum, and the Great Smoky Mountains National Park. Six of these specimens were taken on Mt. Mitchell, and the other two were taken at Blackstock Knob Mountain, slightly over four miles along a ridge to the southwest of Mt. Mitchell. None of these agreed with my topotypic specimen nor with the very clear original description of *Spelerpes danielsi* Blatchley (1901, p. 760-762). The conclusion was reached that the illustration in Bishop's book actually represented another form and the name *G. danielsi danielsi* had been misapplied. In discussion with Dr. Bishop concerning these specimens he confirmed my belief that actually two forms are involved, one apparently unnamed, in the populations formerly referred to *G. danielsi danielsi*. Bishop (1924, p. 90) had commented on the differences between these in an earlier publication.

\*Contribution of the Department of Zoology and the University of Illinois Museum of Natural History, Urbana.

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The following conclusions and description are results of the examinations made.

*Gyrinophilus danielsi polystictus* subsp. nov.

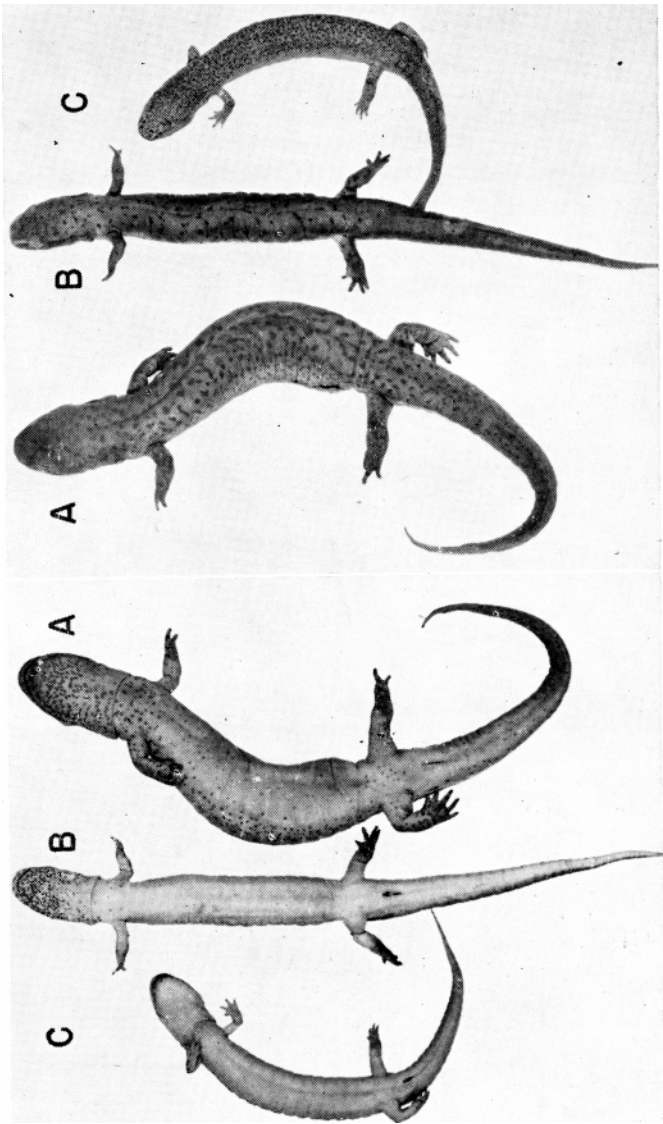
*Type.* S. C. Bishop Coll. No. 103, female, collected on Mt. Mitchell, Yancey County, North Carolina at 6000 feet altitude by S. C. Bishop, October 22, 1926 (Figure 1, A).

*Paratypes.* S. C. Bishop Coll. No. 102, 104, and 105, Mt. Mitchell, Yancey County, North Carolina, 6000 feet; CNHM 55671 and 55672, Blackstock Knob Mountain, Yancey County, North Carolina, 6000 feet; CNHM 55673, Mt. Mitchell, Yancey County, North Carolina, 4800 feet; CNHM 7055, Mt. Mitchell, Yancey County, North Carolina, 6000 feet.

*Diagnosis.* A *Gyrinophilus* with numerous large (diameter 1 to 2 mm. in mature specimens) coalescing spots dorsally on head, limbs, body, and tail, becoming smaller and more diffuse laterally; the throat heavily reticulated to the insertion of the forelimbs, and venter sparsely dotted; can thus rostralis with a white orbitolabial line bordered below by black and imperfectly bordered above; size large, the length reaching a known maximum of 204 mm. and the head large in proportion with the body.

*Type Description.* Snout swollen, blunt; a small tubercle at end of nasolabial groove; canthus rostralis prominent; eye length about two thirds the distance from anterior angle of eye to nostril; both eyelids fitting under a fold of skin at posterior angle; a groove running posteriorly from eye to gular fold intercepted by a single small fold slightly posterior to angle of jaw; vomerine teeth 9 – 9 commencing about half their length beyond the outer border of inner nares and curving anteriorly to join the parasphenoids at an acute angle; the parasphenoids extending posteriorly beyond rictus of jaws approximately half their length, separated by a little less than half the length of a vomerine series; body subcylindrical; costal grooves 18 (including one axillary and one inguinal); 7 costal grooves between appressed toes; limbs well developed and stout; fingers 3-2-4-1 in order of length, slightly webbed at base; toes 3-4-2-5-1 in order of length, not webbed; vent ridged anteriorly; tail subquadrate at base becoming subcylindrical with a keel appearing in basal third, distal two thirds very compressed with prominent keel.

Color in alcohol: dorsum reddish brown becoming yellowish brown laterally and on venter; black spots coalescing dorsally to the extremity of tail, becoming smaller and more diffuse laterally, and the venter with scattered dots; orbitolabial line on canthus rostralis bordered heavily beneath with black, imperfectly and more faintly bordered above; labial region heavily barred



with black; throat heavily reticulated, with numerous spots posteriorly to insertion of forelimbs.

Total length 186 mm.; snout to vent length 111 mm.; head width 16 mm.; length of head 20.5 mm.; tail 75 mm.

*Variation.* The principal variation appears to be the pigmentation which in some specimens is slightly more diffuse dorsally than in the type. The markings on the throat are constant but very faint in young specimens. In one adult specimen the venter is immaculate posterior to the forelimbs. The costal grooves between appressed limbs vary from 6 to 7.5. Size of adult specimens available varies between 164 and 204 mm. with an average length of 182 mm. which, as contrasted with an average of 145.5 mm. for two large *G. danielsi danielsi*, indicates a larger size for the new form.

*Distribution.* Apparently localized to altitudes above 4500 feet and known only from Mt. Mitchell and Blackstock Knob Mountain, Yancey County, North Carolina. These two localities are connected by a ridge slightly over four miles long which does not go below 5500 feet.

*Remarks.* This form is considered a subspecies due to the similarity to *G. danielsi danielsi*, the main differences being the larger size, denser spotting, extension of the reticulation and spotting of the throat posteriorly to the insertion of the forelimbs, and the spotting of the venter. Comparison of markings indicates that in *G. danielsi danielsi* the dorsal spots are smaller and sparser, the venter is immaculate, and the throat reticulations rarely reach the gular fold.

This form seems to have differentiated from *G. danielsi danielsi*, but only because of its greater similarity to that form. An accurate plotting (according to locality and altitude) is needed before a positive statement may be made concerning origins of the various forms.

Among the specimens examined were two identified by King (1939, p. 554) as *G. danielsi* x *duryi* and later (1944, p. 255) referred to *G. danielsi dunni*. Examination of these specimens and four paratypes of *G. danielsi dunni* reveals that King's specimens are not *danielsi dunni*. Instead, although they do show the characteristics reported, the writer regards them as aberrants of *G. danielsi danielsi*. A third specimen, cm 26937 taken at 2000 feet, displayed the same characteristics. It has been noted that an altitudinal cline occurs in this species. Another specimen, R.W.R. Field No. 233 taken at 3400 feet, was exceptional in that its markings and size were midway between the lowland forms and the high altitude forms of the Smoky Mountains and offered support for the altitudinal cline as an explanation of these aberrants.

Distribution of the four paratypes of *G. danielsi dunni* (one, an excellent typical specimen, from Pickens County, South Carolina; one from Rabun

County, Georgia; and two from Jefferson County, Tennessee) indicates overlapping with *G. danielsi danielsi* in a certain area of eastern Tennessee. As a matter of fact, however, USNM 68820 and 68186, both from Jefferson County, Tennessee, should be referred to *G. porphyriticus*. Both specimens present a rather clouded appearance in their dorsal pigmentation, and any flecking

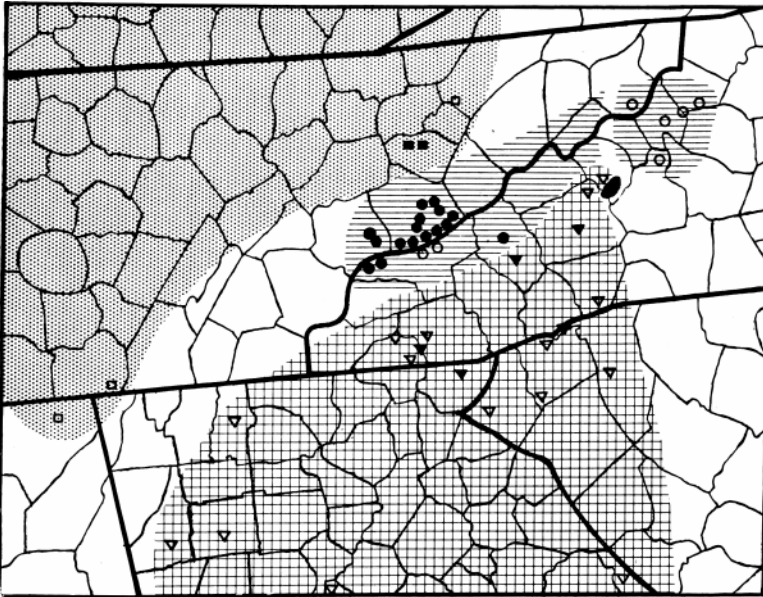


Figure 2.\* Distribution of the forms of *Gyrinophilus* of the southern Appalachians and adjacent areas. Solid symbols represent specimens examined; hollow, not examined. *Gyrinophilus porphyriticus porphyriticus*, squares and range in dots; *Gyrinophilus danielsi dunni*, triangles and range a grid pattern; *Gyrinophilus danielsi danielsi*, circles and range in horizontal lines; *Gyrinophilus danielsi polystictus*, solid shading.

present is quite obscure. These specimens and one from Hawkins County, Tennessee, which was not examined, furnish the only basis for extending the range of *G. danielsi dunni* across the mountains into Tennessee from a line roughly approximating the line from Stocksville, Buncombe County, North Carolina to Eaton, Murray County, Georgia. Specimens which are more typical are needed before visualizing the range as extending into Tennessee. Present evidence would instead support a concept of the range of *G. porphyriticus*

\*After completion of Figure 2, specimens from the area about Avery County, North Carolina, were received and are not plotted with solid symbols.

*porphyriticus* extending into the area concerned; this is a far more reasonable supposition insofar as both the appearance of the specimens and the geographic probabilities are concerned, than the former concept of the northern range extension of *G. danielsi dunni*.

There is also an apparent overlap in the distribution of *G. d. dunni* and *G. d. polystictus*, but if altitudinal distribution is considered, no overlap actually occurs. Hairston (1947, p. 2) sets the upper limit of the range of *G. d. dunni* at 5000 feet on the basis of a specimen taken at 4800 feet on Mt. Mitchell (CNHM 55673). Actually (1) this specimen is not *G. danielsi dunni* but should be referred to the new form (of which it is a paratype); and (2) it marks the lowest elevation at which *G. d. polystictus* is known. Mittleman (1941, p. 3) more accurately sets the upper limit of the range of *G. d. dunni* at 3500 feet. This may well be extended upward in the future.

The sources for the data plotted in Figure 2 were in the literature cited, specimens examined, and the files of Dr. S. C. Bishop. All *G. danielsi dunni* records obtained were plotted including the record by Dunn (1926, p. 271) in Floyd County, Georgia, which was identified as *G. danielsi* before *G. d. dunni* was described. Many *G. danielsi danielsi* records were not plotted because of their appearance before the description of *G. danielsi dunni*; and therefore without examination their true identities cannot be determined. Likewise no records involving larvae were plotted. The specimens personally examined and identified by the author were as follows.\*

*G. d. danielsi*: CNHM 16052, 15751, 15752, 15753, and 15754, Sevier County, Tennessee; SMNP G.d. - 1-8, 11, 14-19 inclusive, Sevier County, Tennessee; G.d. x d.-1 and G.d. x d. - 2, Blount County, Tennessee; G.d. - 9 and G.d. - 12, Swain County, North Carolina; G.d. - 10, Haywood County, North Carolina; CM 6321, Watauga County, North Carolina; CM 6336 and 6337, Avery County, North Carolina; CM 6527, Sevier County, Tennessee; CM 15830, 15831, and 15832, Caldwell County, North Carolina; CM 26937, Blount County, Tennessee; R.W.R. Field Nos. 233, 345, 346 (Fig. 1, B), and 365, Sevier County, Tennessee.

*G. d. dunni*: USNM 102440 (Fig. 1, c), Greenville County, South Carolina; USNM 102441, Rabun County, Georgia; CNHM 19234 and 19235, Buncombe County, North Carolina; CNHM 48041, Macon County, North Carolina; S.C.B., Haywood County, North Carolina.

*G. d. polystictus*: SCB 102, 103, 104, and 105, Yancey County, North Carolina; CNHM 7055, 55671, 55672, and 55673, Yancey County, North Carolina.

*G. porphyriticus porphyriticus*: USNM 68168 and 68820, Jefferson County, Tennessee.

\*Abbreviations are as follows: CM - Carnegie Museum; CNHM - Chicago Natural History Museum; RWR - Robert W. Reese; SCB - Sherman C. Bishop; SMNP - Smoky Mountains National Park; USNM - U. S. National Museum.

Figure 2 represents the probable distribution of the three subspecies of *G. danielsi* as pictured by the author, and presents a probable range extension of *G. porphyriticus porphyriticus*. The section centered in Avery County, North Carolina would seem to be an isolated population but comparison of specimens from that area with those of the area centered in the Smoky Mountains reveals no significant differences.

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